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Professor and students get to work with world's largest radio telescope

FEBRUARY 12, 2007

How do you find something that is not only invisible to the human eye, but also located trillions of miles from earth?

Well, it helps to have the world's largest radio telescope at your disposal.

A professor in the Department of Physics at Georgia Southern University and two her students recently returned from a visit to the world-renowned Arecibo Observatory in Puerto Rico.

Professor Sarah Higdon and physics majors Josh Davidson and Daniel Richey are members of the Arecibo Legacy Fast ALFA survey (ALFALFA). Using the observatory's radio telescope which features a dish that measures 1,000 feet in diameter the survey is searching for dark galaxies.

'These objects consist mainly of dark matter and hydrogen gas, with very few stars,' Higdon explained. 'The lack of starlight means the galaxies are invisible and will remain undetected unless we can detect their hydrogen gas using radio observations.'

'The survey is also looking for larger gaseous features known as tidal tails. These are formed when galaxies collide and can be 500,000 light years in length, which is five times longer than the diameter of our own galaxy, the Milky Way.'

'The detection of both dark galaxies and tidal tails will help astronomers understand how galaxies form and evolve in the universe.'

The Arecibo Observatory is part of the National Astronomy and Ionosphere Center, a research facility operated by Cornell University under a cooperative agreement with the National Science Foundation. Additional support is provided by NASA.

Operating 24 hours a day, 365 days a year, the Arecibo Observatory is considered one of the most important centers for research in radio astronomy, planetary radar and terrestrial astronomy.

According to Higdon, radio telescopes are crucial instruments in the study of the heavens because they can detect things that are invisible to optical telescopes.

Light, she noted, consists of electromagnetic waves, and different colors of light are electromagnetic waves of different lengths. But visible light covers only a small part of the range of wavelengths in which electromagnetic waves can be produced.

Radio waves are electromagnetic waves of significantly greater wavelength than those of light. In 1932, scientists learned that astronomical objects such as planets, stars and gases emit radio waves, and astronomers have since figured out how to make pictures from these waves.

A radio telescope is comprised of numerous intricate parts, but the most striking feature of the one at the Arecibo Observatory is its dish. Looking somewhat like a TV satellite receiver on steroids, the dish covers almost 20 acres and is 167 feet deep. The surface of the dish is made up of almost 40,000 aluminum panels, each one measuring about three feet by six feet.

A platform that contains antennas, radio receivers and other highly sensitive equipment is suspended 450 feet above the dish. The 900-ton platform is supported by 18 cables that are strung from three reinforced concrete towers that are positioned around the dish.

Thanks to the Arecibo Observatory's mammoth radio telescope, the ALFALFA survey expects to locate and study 20,000 galaxies, some of which are a billion light years away from earth.

A single light year, by the way, is six trillion miles.

'Radio observations are often used to see the 'stuff' between the stars, which is called the interstellar medium,' Higdon said. 'The ALFALFA survey is detecting atomic hydrogen gas in the interstellar medium. A typical timescale for the emission of a photon from a single hydrogen atom is around 11 million years. That's a long time to wait to see something!

'However, there is such a vast amount of hydrogen in these atomic clouds that we can detect them in a matter of minutes using the Arecibo telescope.'

Use of the radio telescope is available on an equal, competitive basis to scientists throughout the world. Through their relationship with the ALFALFA survey, which is led by Cornell professors Riccardo Giovanelli and Martha Haynes, the Georgia Southern group was able to work at the Arecibo Observatory for five days in January.

During the first four nights, Higdon and her students labored from midnight until 6 a.m., pointing the telescope to specific coordinates and monitoring the flow of data that was collected by the system's computers.

On the fifth night, the telescope was used for radar observations of Saturn, so Higdon, Davidson and Richey ascended the platform that hangs 45 stories above the dish. Once there, they helped to put a protective cover on the Arecibo L-band Feed Array (ALFA), a sophisticated seven-receiver system that allows large-scale surveys of the sky to be conducted with unprecedented sensitivity. The cover protects ALFA from the potentially destructive radar waves.

'The ALFALFA survey will take about six years to complete, and this trip was the first step in our students becoming regular participants," Higdon said. 'Few undergraduate students ever get the chance to participate in an astronomical observing run at a world-class facility. This opportunity is usually only available to Ph.D. students."

Davidson is a sophomore from Byron, Ga., and Richey is a junior from Claxton, Ga. In addition to visiting the Arecibo Observatory, these and other Georgia Southern students will be trained as remote observers who can control the radio telescope from offices within the University's physics department. They will analyze the data as part of their research projects and present their findings at a conference in Puerto Rico this fall.

'The direct involvement of undergraduate students in research projects within a legacy survey will enhance their education, and involvement in interesting, exciting research projects encourages students to consider careers in science," Higdon said. 'The Arecibo program will extend research opportunities to undergraduates who otherwise not participate. This is especially important as we see a declining number of domestic students continuing in science.

'Faculty and peer mentoring, which is an important part of this program, is a proven method for facilitating the next generation of astronomers."

Georgia Southern professor is helping to develop international standards for nursing education

FEBRUARY 12, 2007

School of Nursing Chair and Professor Jean Bartels was one of 30 international leaders in nursing who met recently in Bangkok, Thailand, to begin developing global standards for basic nursing and midwifery education. The meeting was called by the World Health Organization, and Bartels attended as a representative of the American Association of Colleges of Nursing.

'The goal of this meeting was to define minimum education standards for an estimated 11 million nurses and midwives around the globe," said Bartels. 'If we reach a consensus on minimum requirements for nursing education, the result will be a better educated health care work force. Ultimately, all nations will have better patient outcomes."

According to a report from Sigma Theta Tau International, the honor society of nursing, the lack of global education standards creates issues for quality care, the immigrating nurse, the potential

employing agency and the recipient country. While many nations have developed standards for nursing practice and education, the standards apply only to one region or country.

During the three-day meeting, participants developed key elements for proposed standards in five areas: educational program admission criteria; educational program development requirements; educational program content components; nursing and midwifery faculty qualifications; and nursing and midwifery program graduate qualifications.

The next steps in developing standards include a comprehensive review of the standards that exist, development of proposed global standards, and broad circulation and review of the proposed standards. The target date for completion of the WHO and Sigma Theta Tau report is January 2008.

Shared leadership workshop aimed at principals and teachers

FEBRUARY 12, 2007

What would happen if the school leadership decisions were based on the pooled expertise of all the teachers, rather than being made by the principal alone?

Educators and administrators from high schools, middle schools and elementary schools throughout the Southeastern United States are invited to learn the answer to this question and many others at a day-long workshop at Georgia Southern University on Thursday, March 8.

“Distributed Leadership: Imperative for Leading School Change in the Flat World” will introduce and evaluate how shared or distributed school leadership affects student achievement, state accountability expectations, and more.

While “distributed leadership” may be a new term to some, the concept has been applied in education circles for at least a decade. Professor Alma Harris, who directs the University of Warwick’s Institute of Education in England, will be the featured speaker at the workshop. She is an expert in the area of distributed leadership, and has published studies in the field.

With the assistance of the University’s Continuing Education Center, the workshop is co-sponsored by the Department of Leadership, Technology and Human Development in the College of Education at Georgia Southern; the Georgia Center for Education Renewal; and iNet, the International Arm of the Specialist Schools and Academies Trust.

The registration fee is \$85 per person. The fee will be reduced to \$70 per person for iNet members and to \$65 per person for groups of four or more from the same school. Lunch is included in the workshop, which will be held at the Nessmith-Lane Continuing Education Building.

To register, visit the workshop Web site at <http://ceps.georgiasouthern.edu/conted> or call (912) 681-5551

Kazakhstan professor here to study U.S. public health programs

FEBRUARY 12, 2007

Imagine learning, at the age of 35, that your nation has unexpectedly a new government and a new economy. Neither you nor your fellow citizens will have purchasing power for two weeks, while your new government creates new money. Under this new government, you will be required, for the first time ever, to purchase health insurance, start a pension fund, and pay for your own higher education. And that's just the beginning a gradual process that involves tremendous change.

It was not easy, but Professor Saulet Nurtayeva lived through this, and more, when Kazakhstan became independent from the U.S.S.R. in 1991.

Nurtayeva, an assistant professor in the Department of Oncology and Radiology at West Kazakhstan Medical School, is visiting the Jiann-Ping Hsu College of Public Health at Georgia Southern University this semester. She is here as a guest of the U.S. Department of State under the Junior Faculty Development Program, which encourages exchange of faculty between countries.

'Before Kazakhstan's independence from the U.S.S.R., we had no schools for public health," said Nurtayeva. 'They were all schools of medicine. They educated doctors to treat our diseases, but the population was not worried about prevention. There was no need to worry, because treatment was readily available and cost was covered by the government.'

Independence changed everything for Nurtayeva, her parents, and her brothers. With a parliamentary government, multiple political parties, a president, and a prime minister, the Kazakhs also learned the price of freedom: not only did they need a new economy, they needed new systems for education and for medical care.

With independence came medical insurance and an understanding that to keep costs down, prevention is important. The need for public health education for the population became clear, especially in the area of tobacco use. In Kazakhstan, life expectancy for women is 70 years, but for

men it is only 61 years, a circumstance tied in part to the fact that men smoke tobacco and women don't.

'In the U.S., public health education has been able to reduce tobacco use and lung cancer," said Nurtayeva. 'We'd like to be able to do that in Kazakhstan, and do it quickly. I want to learn the public health programs used here and apply them in my country."

Nurtayeva is especially pleased to be at the Jiann-Ping Hsu College of Public Health because of its emphasis on health promotion and disease prevention in rural areas.

She comes from west Kazakhstan, an area close to Russia with a population density similar to the rural areas of Georgia. She is also excited to work with the Georgia Cancer Coalition and learn how to help her people benefit from cancer screenings and cancer education.

Although she is not teaching a regular schedule, Nurtayeva will be making presentations on campus, attending epidemiology and environmental health classes, and observing public health researchers to learn their methods. She arrived Jan. 8 and will be at Georgia Southern until the semester ends.

'I am grateful to be part of this faculty exchange experience," she said. 'What I learn here will help me find ways to bring better health to the people of Kazakhstan."

SIFE students use grant to teach importance of saving

FEBRUARY 12, 2007

The Georgia Southern University Students In Free Enterprise (SIFE) team has been awarded a \$1,000 grant from HSBC Global Education Trust. The grant will fund a project to educate women who have experienced domestic violence about the benefit of saving early for retirement.

'Student members of the SIFE team will be working with representatives from BB&T in Statesboro to educate a group from Safe Haven, a shelter for battered women, about the benefits of saving early for retirement," said assistant professor John King. King and assistant professor Amanda King, are faculty members in the School of Economic Development at Georgia Southern and serve as faculty advisors to SIFE.

'As part of the project, SIFE will match each woman's monthly contributions (up to \$25 per month) to a systematic saver CD at BB&T for one year," said John King. 'At the end of the year, the money in the CD will be used to open an individual retirement account for each participant."

While the SIFE chapter has funds to initiate this project, it welcomes support from individuals or corporations that may be interested in providing financial assistance to help carry out this year-long effort. If you would like to help with the SIFE project, contact John King at jking@georgiasouthern.edu or at 912-681-0388 or Amanda King at aking@georgiasouthern.edu or at 912-681-0535 for more information.

Students In Free Enterprise is an international, non-profit organization founded in 1975 to provide college and university students the best opportunity to make a difference and to develop leadership, teamwork and communication skills through learning, practicing and teaching the principles of free enterprise. SIFE teams conduct educational outreach projects that help individuals in their community improve their quality of life and standard of living.

SIFE teams are mentored by faculty advisors who are named Sam M. Walton Free Enterprise Fellows in honor of the late Wal-Mart founder.